WHAT IS CLAIMED IS:

1. An injection laser comprising at least one gain region having a longitudinal gain axis and outputting laser radiation at an outflow angle φ, said injection laser comprising:

a laser heterostructure comprising:

an active layer forming said at least one gain region;

cladding layers comprising at least one layer having a refractive index, and

ohmic contacts; and

at least one radiation inflow region adjoining said laser heterostructure that is transparent to said laser radiation, has a refractive index n_{RIR}, and is located on at least one side of said active layer, said radiation inflow region including at least one optical facet, an outer surface, and an inner surface, said optical facet being oriented at an angle of inclination ψ with respect to a plane perpendicular to said longitudinal gain axis; and

reflectors that together form an optical resonator at least part of which coincides with at least part of said radiation inflow region and at least part of said gain region,

wherein said laser heterostructure and said adjoining radiation inflow region together have an effective refractive index n_{eff} such that

n_{RIR} exceeds n_{eff};

$\arccos (n_{eff}/n_{RIR}) \leq \arccos (n_{eff\text{-}min}/n_{RIR})$;

and

$n_{eff\text{-}min}$ is greater than n_{min},

where $n_{eff\text{-}min}$ is the minimum value of n_{eff} for laser heterostructures with radiation inflow regions that produce outflow of radiation from the active layer into the radiation inflow region, and n_{min} is the smallest of the refractive indices in the cladding layers of the heterostructure.

2. The injection laser of Claim 1, wherein said active layer comprises at least one sublayer.

3. The injection laser of Claim 2, wherein said cladding layers are respectively disposed on a first surface and on an opposite second surface of said active layer and comprise cladding sublayers I_i and II_j, respectively, with refractive indices n_{Ii} and n_{IIi} and bandgaps E_{Ii} and E_{IIi}, respectively, where $i = 1, 2, \ldots, k$ and $j = 1, 2, \ldots, m$ are defined as integers that designate the sequential numbers of the cladding sublayers counted from the active layer with at least one cladding sublayer within each cladding layer.

4. The injection laser of Claim 3, wherein at least one of said cladding sublayers disposed between said active layer and said radiation inflow region is electrically conductive and has an ohmic contact formed therewith.

5. The injection laser of Claim 4, wherein at least two of said cladding sublayers disposed between said active layer and said radiation inflow region comprise electrically conducting semiconductors having bandgaps of varying sizes, said ohmic contact being formed with said sublayer having the smallest bandgap.

6. The injection laser of Claim 3, wherein that at least one of said cladding sublayers has a refractive index at least as large as the refractive index n_{RIR} of said radiation inflow region.

7. The injection laser of Claim 1, wherein said at least one optical facet is oriented so as to subtend an acute angle with the inner surface.

8. The injection laser of Claim 1, wherein said laser heterostructure includes barrier regions.

9. The injection laser of Claim 1, wherein said gain region comprises a strip-type gain region.

10. The injection laser of Claim 1, wherein:

said gain region has a length L_{GR} and a width W_{GR}; and

said inner surface of the radiation inflow region has a length L_{RIR} and a width W_{RIR} respectively at least as large as the length L_{GR} and width W_{GR} of said gain region.

11. The injection laser of Claim 10, wherein said radiation inflow region includes a first portion having a thickness no greater than W_{GR} that borders said laser heterostructure and is electrically conductive, said radiation inflow region having a second portion that comprises material having an optical loss factor α_{RIR} of no more than about 0.1 cm^{-1}.

12. The injection laser of Claim 11, wherein an ohmic contact is formed with said electrically conductive portion of said radiation inflow region.

13. The injection laser of Claim 1, wherein said radiation inflow region has a thickness ranging between about 2 to about 50,000 micrometers (μm).

14. The injection laser of Claim 1, wherein said radiation inflow region comprises an optically homogeneous material.

15. The injection laser of Claim 14, wherein said radiation inflow region comprises a semiconductor having a bandgap E_{RIR} (eV) and said active layer comprises a semiconductor having bandgap E_a (eV), said bandgap E_{RIR} (eV) exceeding said bandgap E_a (eV) of the active layer by more than about 0.09 eV.

16. The injection laser of Claim 1, wherein said radiation inflow region comprises a substrate.

17. The injection laser of Claim 1, wherein said radiation inflow region is electrically conductive.

18. The injection laser of Claim 17, wherein an ohmic contact is formed with said radiation inflow region.

19. The injection laser of Claim 1, wherein a portion of said radiation inflow region comprises a plurality of layers oriented parallel to said inner surface, said plurality of layers comprising materials having different refractive indices.

20. The injection laser of Claim 1, wherein said radiation inflow region has an optical loss factor α_{RIR} of no more than about 0.1 cm^{-1}.

21. The injection laser of Claim 1, wherein:

said gain region is bounded at two opposite ends by two side surfaces;

at least one of said side surfaces is inclined at an angle with respect to said inner surface, said angle being identical to an angle formed between one of said adjacent optical facets with said inner surface; and

said side surface has a reflection coefficient equal to that of said adjacent optical facet.

22. The injection laser of Claim 1, wherein said at least one optical facet comprises one of said reflectors of said optical resonator and is formed such that said angle of inclination ψ is equal to the outflow angle φ, which is equal to arccos (n_{eff}/n_{RIR}).

23. The injection laser of Claim 1, wherein:

said at least one optical facet is oriented such that said angle of inclination ψ is equal to $(\pi/4) - (\varphi/2)$ where $\varphi = \arccos(n_{eff}/n_{RIR})$; and

at least part of said outer surface of the radiation inflow region that coincides with a projection of said optical facet formed thereon forms one of said reflectors of the optical resonator.

24. The injection laser of Claim 1, wherein:

said at least one optical facet is oriented such that said angle of inclination ψ is equal to $(\pi/4) + (\varphi/2)$, where $\varphi = \arccos(n_{eff}/n_{RIR})$; and

at least part of one surface of said injection laser opposite to said inflow region that coincides with a projection of said optical facet formed thereon, forms one of said reflectors of said optical resonator.

25. The injection laser of Claim 1, wherein one of said optical facets is oriented such that said angle of inclination ψ is equal to zero.

26. The injection laser of Claim 25, wherein said optical facet comprises a reflective coating formed thereon.

27. The injection laser of Claim 1, wherein at least one of said reflectors of said optical resonator comprises an external reflector.

28. The injection laser of Claim 27, wherein said radiation inflow region comprises two optical facets each optical facet oriented such that said angle of inclination ψ with respect to said plane perpendicular to said longitudinal gain axis is equal to zero.

29. The injection laser of Claim 28, wherein at least one of said reflectors of said optical resonator comprises a cylindrical mirror.

30. The injection laser of Claim 27, wherein at least one of said reflectors of said optical resonator comprises a plane mirror.

31. The injection laser of Claim 27, wherein at least one of said reflectors of said optical resonator comprises a diffraction grating.

32. The injection laser of Claims 1, wherein at least one of said reflectors of said optical resonator comprises a spherical mirror.

33. The injection laser of Claim 1, comprising at least two gain regions each having a longitudinal gain axis and being disposed adjacent an inner surface of at least one radiation inflow region.

34. The injection laser of Claim 33, wherein an independent ohmic contact is formed with each of said gain regions, each ohmic contact positioned opposite said radiation inflow region.

35. The injection laser of Claim 33, comprising at least two sequences of gain regions and a common radiation inflow region for each sequence of gain regions, each sequence of gain regions comprising at least two gain regions, said longitudinal gain axis of each gain region in each sequence being parallel to each other and being disposed at right angles to a line of intersection between active layers and an extension of a plane of an optical facet of said common radiation inflow region.

36. The injection laser of Claim 35, further comprising ohmic contacts adjoining strips of metallization for respective sequences of gain regions, said strips of metallization formed on at least part of the outer surface of at least one of said common radiation inflow regions.

37. The injection laser of Claim 35, further comprising independent ohmic contacts formed with strips of metallization that are positioned parallel to said gain axes of said gain regions and that are insulated from each other, said strips of metallization being located opposite said radiation inflow region.

38. The injection laser of Claim 35, wherein said gain regions are formed along at least one line parallel to said longitudinal gain axes of the gain regions.

39. The injection laser of Claim 38, wherein:

said radiation inflow region has an outer surface and a thickness d_{RIR}, said gain regions having leading edges closest to one side of said heterostructure, said gain regions being separated by a distance equal to $2d_{RIR}/\tan\varphi$ when measured from respective leading edges of said gain regions; and

at least part of said outer surface coinciding with a projection of said gain region onto it is optically reflective.

40. The injection laser of Claim 35, wherein:

at least two adjacent gain regions are electrically isolated by a nonconductive part of said radiation inflow region, and

ohmic contacts associated with each of said gain regions are electrically coupled by a metallization layer.

41. The injection laser of Claim 1, further comprising at least two gain regions each having longitudinal gain axis and adapted to output light at identical outflow angles φ, said gain region formed on opposite surfaces of said radiation inflow region along two lines that are parallel to each other and to said longitudinal gain axes, said gain regions having leading edges nearest to a common side of said heterostructure, said gain regions on opposite sides of the inflow region being separated by a distance of $d_{RIR}/\sin\varphi$ when measured from said leading edges, where d_{min} is the thickness of said radiation inflow.

42. The injection laser of Claim 1, further comprising a semiconductor layer formed on said radiation inflow region, said semiconductor layer having a refractive index less than said effective refractive index n_{eff}.

43. The injection laser of Claim 42, wherein said semiconductor layer has a refractive index approximately equal to n_{min}.

44. The injection laser of Claim 1, wherein said radiation inflow region has a thickness d_{RIR} in a range between about 2 and 100 micrometers.

45. The injection laser of Claim 1, wherein said at least one said gain region flares outward from a portion having a first width to a portion having a second width larger than said first width.

46. The injection laser of Claim 1, wherein said at least one gain region comprises at least three gain regions, said at least three gain regions including a middle gain region surrounded by first and second end gain regions.

47. The injection laser of Claim 46, wherein one of said cladding layers is thicker along a portion adjacent said middle gain region than along portions adjacent said first and second end gain regions.

48. The injection laser of Claim 46, wherein both of said cladding layers has a substantially identical thickness along said middle gain region and said first and second end gain regions.

49. The injection laser of Claim 46, wherein said ohmic contacts comprise at at least a first ohmic contact associated with said middle gain region, a second ohmic contact associated with said first end gain region, and a third ohmic contact associated with said second end gain region.

50. The injection laser of Claim 46, wherein said ohmic contacts include one continuous ohmic contact associated with the middle gain regain and the first and second end gain regions.

51. The injection laser of Claim 46, wherein said radiation inflow region comprises a rectangular parallelepiped.

52. The injection laser of Claim 46, further comprising a semiconductor layer having a refractive index less than said effective refractive index n_{eff} formed on said radiation inflow region.

53. The injection laser of Claim 46, wherein said at least one radiation inflow region comprises at least one radiation inflow region on each of opposite sides of said active layer.

54. The injection laser of Claim 53, further comprising semiconductor layers having refractive indices less than said effective refractive index n_{eff} formed adjacent each of said radiation inflow regions.